

**NON-ATTENDANCE IN PAEDIATRIC OUTPATIENT  
CLINICS, TEXT REMINDER VERSUS  
CONVENTIONAL SYSTEM A RANDOMISED  
CONTROL TRIAL**

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**DISSERTATION SUBMITTED IN PARTIAL  
FULLFILLMENT OF THE REQUIREMENT FOR THE  
DEGREE OF THE MASTER OF MEDICINE  
(PAEDIATRICS)**



**UNIVERSITI SAINS MALAYSIA**

**2017**

## **ACKNOWLEDGEMENT**

I will begin by thanking Allah, The Most Gracious and the Most Merciful. Without his guidance, I would not have been able to complete this challenging task.

I here would like to express my gratitude to my supervisors, Associate Prof Noorizan Abd Majid, Dr Rowani Mohd Rawi and Associate Professor Dr Ariffin bin Nasir. Your constant sincere critics and advices have made this possible, and I cannot thank all of you enough.

A special thanks to Associate Professor Dr Norsarwany bt Mohamad, head of department of Paediatrics, Hospital Universiti Sains Malaysia, for her support and permission to carry out this study in Hospital Universiti Sains Malaysia.

And to my family members, colleagues and supporting staff members, your contributions did not ever go unnoticed. This teamwork was enormous, and I believe without your assistance and faith in me, this dissertation would not have been ready in time.

Walk on, walk on,

With hope in your heart,

And you'll never walk alone,

You'll never walk alone.....

**TITLE: NON-ATTENDANCE IN PAEDIATRIC OUTPATIENT CLINICS, TEXT  
REMINDER VERSUS CONVENTIONAL SYSTEM A RANDOMISED CONTROL  
TRIAL**

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## **LIST OF SYMBOLS, ABBREVIATIONS AND NOMENCLATURE**

NAR	: Non-attendance rate
SMS	: Short message service
USM	: Universiti Sains Malaysia

## **ABSTRACT**

**INTRODUCTION:** A high non-attendance rate (NAR) in outpatient clinics continues to pose a significant problem worldwide. A high NAR has negative consequences to costs of health care and quality of patient care. Hence, this study was undertaken to evaluate if SMS reminder could improve the NAR compared to the conventional system in a paediatric clinic at a tertiary hospital in East Coast Malaysia.

**Methods:** We conducted a parallel single blind randomised controlled study where consented parents of patients that required a clinic appointment were recruited into the study. Upon randomisation, subjects were allocated either to the intervention group that will receive SMS reminder or the control group. In the intervention group, an SMS reminder will be sent a week before the appointment date but the control group will not be given any reminder.

**Results:** 314 subjects were analysed in control group and 309 subjects for the intervention group. The NAR in our clinics was 33% and the SMS reminder significantly reduced the NAR in the intervention compared by 15.1% ( $p < 0.001$ ) to the conventional system. There was no association of poor socioeconomic group with poor attendance rate.

**Conclusion:** SMS reminder was effective in reducing the NAR at Paediatric outpatient clinics compared to the conventional system. Poor socioeconomic status did not have any negative effect in attendance rate.

**Key words:** non-attendance, missed appointments, SMS reminder, outpatient (224 words)

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## **ABSTRAK**

**Pengenalan:** Kadar ketidakhadiran di klinik pesakit luar terus menimbulkan masalah di seluruh dunia.. Objektif utama di dalam kajian ini adalah untuk membandingkan kecekapan sistem SMS sebagai peringatan dengan kaedah biasa konvensional, sebelum temujanji yang ditetapkan di klinik di sebuah hospital tertiary berpakar di pantai timur semenanjung Malaysia.

**Kaedah-kaedah:** Kaedah kajian ialah secara rawak klinikal terkawal di kalangan ibu bapa pesakit kanak-kanak. Setelah pembahagian secara yang adil tetapi rawak, mereka akan dibahagikan kepada kumpulan intervensi atau konvensional. Untuk golongan intervensi, mereka akan menerima peringatan secara SMS manakala tiada peringatan langsung untuk kumpulan konvensional.

**Keputusan :** 314 subjek dianalisa di dalam kumpulan konvensional, manakala 309 di dalam kumpulan intervensi. Kami mendapati kadar ketidakhadiran pesakit secara keseluruhan pada tempoh kajian adalah 33%. Kadar ketidakhadiran juga jauh lagi rendah dikalangan mereka yang menerima SMS sebanyak 15.1% ( $p < 0.001$ ). Keputusan juga menunjukkan tiada hubungan yang kukuh di antara kumpulan sosioekonomi rendah dengan kadar ketidakhadiran.

**Kesimpulan:** Kadar ketidakhadiran di klinik luar kanak-kanak di Hospital USM ialah 33%. Manakala peringatan secara SMS sebelum temujanji klinik efektif dalam menurunkan kadar ketidakhadiran di klinik pesakit luar.

**Kata-kata kunci:** kadar ketidakhadiran; terlepas temujanji; peringatan secara SMS

# **NON-ATTENDANCE IN PAEDIATRIC OUTPATIENT CLINICS, TEXT REMINDER VERSUS CONVENTIONAL SYSTEM A RANDOMISED CONTROL TRIAL**

## **INTRODUCTION**

Over the past few years, we have been seeing an increase in health budget expenditure <sup>(2,5,7)</sup>. One of the most affected areas is outpatient care. It is frustrating to note that regular audits are still indicating underutilisation <sup>(7)</sup> of these services, and one of the identified contributing factors is high non-attendance rates among the patients.

2 of the major discussion points are why continuity of good medical care is important <sup>(2,4)</sup> and what is the best way to reduce the non-attendance rate. A holistic approach within this context will result in a healthier community and country, together with a better financial spending to get the best possible outcome.

A good continuity <sup>(4)</sup> of outpatient care has been shown previously to improve patients medically as well as a reduction in visits to ED, in a study for Diabetes Mellitus Type 1 on insulin injection. The resulting complications and subsequently hospital admissions are bound to happen when there is a breakdown in the care continuity. Nowadays, especially with the discovery of rarer diseases, a strong emphasis on turning up to scheduled appointment dates is becoming an understatement.

The finding of efficacy of SMS has been documented in many studies. They have resulted in better attendance rates. Tamim et al in 2011 <sup>(1)</sup> showed that phone reminder was effective in improving the non-attendance rate, however only 32% of the recruited subjects were contactable. In a systematic review <sup>(2)</sup> comparing the reminder systems, SMS and phone

reminder have been shown to be effective in reducing the non-attendance rates. In a meta-analysis published in Cochrane <sup>(8)</sup>, despite having the same effectiveness as SMS reminder, telephone reminder is associated with greater cost consumption and time consuming.

The other important aspect in the discussion of poor non-attendance rates is the identification of risk groups. An RCT in Geneva <sup>(8)</sup> on different types of reminders did acknowledge the poor socioeconomic status as one of the reasons of poor attendance. There is insufficient evidence to analyse the association of poor socioeconomic status in the Malaysia context. Meanwhile, Tamim et al discussed in 2011 that the main reason of non-attendance was forgetfulness. This reason of not turning up to clinic appointment is preventable, and more importantly, fixable.

We therefore conducted a randomised control study with the main objective to compare the efficacy of SMS compared to the conventional system. The location of the study was Paediatric Clinic Hospital USM, and the recruited subjects were the parents of paediatric patients. 646 patients were recruited and randomly allocated to intervention and control group. In the intervention groups, subjects would receive an SMS reminder 1 week before their scheduled appointment whereas no reminder was sent to the control group. To analyse the association of poor socioeconomic factors with non-attendance rate, a multiple logistic regression was used. The variables used were salary, level of education, main caretaker and types of clinic.

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## **STUDY PROTOCOL**

### **NON ATTENDANCE IN OUTPATIENT PAEDIATRIC CLINICS, TEXT REMINDER VERSUS CONVENTIONAL SYSTEM A RANDOMISED STUDY**

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**Co-researchers: (MMC No. if applicable):**

- **PROF MADYA DR NOORIZAN BT MAJID**
- **DR ROWANI MOHD RAWI**

A poor non-attendance rate in outpatient settings is a serious concern. We see this as a big obstacle in delivering the best optimum care to the patients. Here in Malaysia, the pattern is rather consistent with many parts of the world. In the study performed in HUSM in 2011, the rate of non-attendance was reported to be as high as 30%.

Malaysia definitely needs to move as fast, in utilising the modern technologies for the betterment of public services. Many studies have been attempted to find the best ways for this purpose. Here in Hospital Universiti Sains Malaysia, we are still using conventional way of clinic appointment. Conventional system here is described as filling in patients' particulars in an appointment book, and a card with appointment date and time written manually is given to the patient as a means of reminder.

It is a global phenomenon that landlines are less used. Smart phones that are now part of our daily lives can be used as a platform to tackle this issue.

Despite being not too far left behind, we have to acknowledge that Malaysia is still a developing status. A large proportion of the youngsters, and Malaysians too in general are mobile phone prepaid users. Text reminders are still widely used as a result, although the trend is changing towards a more user friendly and flexible applications, such as *Whatsapp*.

Hence, we would like to study the use of pre-existing means, i.e. SMS as a way of reminder to improve the non-attendance rate in our Paediatric Clinic.

## **LITERATURE REVIEW**

This study is intended to build on the finding on the 'Non-attendance to the paediatric clinics in a Malaysia tertiary hospital: A sizeable problem and identification of an efficacious intervention'. This study was published in the Journal of Paediatrics and Child Health in 2011. The aim of this study was to determine the rate, causes and risk factors of non-attendance to the paediatric clinics in HUSM and to determine the efficacy of one telephone call to confirm a new appointment.

The intervention was within 3 days of non-attendance, a telephone call was made by the primary investigator, reasons were recorded in the study pro forma. Subsequently a new appointment was given within 2 weeks. In this study, 497 patients (31.8%) did not attend the appointment. Only 160 of the patients were contactable.

50.5% of the total reasons reported were from forgetfulness. Out of these 497 patients, 95 patients were given a new appointment. Attendance rate within this small group is 76.8% but in overall it was only 14.7%. This study shows that a single telephone call was effective in getting the patients to come to the clinics again, however only a small number of patients were able to detected hence the overall improvement was only 14.7%

**Despite having a promising result, it does not tell the whole picture of its success. It is paramount to note that the effort to reach these defaulting patients was not easy. This is translated clearly from the 497 non-attendees, only 160 patients were contactable. This makes a total of a total of 68% of non-attendance. 68% or 337 patients is an extremely a large portion of patients missing their appointments, despite having their phone numbers recorded in the registration system.**

Another literature that caught my attention was a study that took place in Geneva, Switzerland in 2010. It was a randomised controlled study that looked into improvement in non-attendance rate between 2 groups, 1 group with reminder system with the conventional system as a control.

In this research, a total of 2023 were recruited and both groups were similar in terms of baseline criteria. Patients were sent a reminder 48 hours before the appointment. First, they will receive a phone call reminder. If no phone response, an SMS reminder. If no available mobile phone number; a postal reminder will be sent.



After the randomisation, 1052 patients were recruited in the intervention group and 1071 patients in the control group. The control group will not receive any reminder before their appointment dates.

This study found that the rate of non-attendance was significantly lower, where the rate was found to be reduced from 11.4% to 7.8%. The striking feature that was analysed too was the financial benefits from the intervention. The benefits of 1850 Euro saved from a 3-month study duration could have been greater if the study was prolonged.

An interesting key point observed was non-attendance rate was higher in younger age group, among asylum seekers and substance abusers. Kelantan, where this study is going to be performed, has a wide variety of socioeconomic background that could possibly yield a similar result to this Geneva study, or otherwise.

There was a study performed in the United States of America in 2011. The study population is the paediatric patients that are scheduled for immunisation. In this study 'Parents' Experiences with and Preferences for Immunisation Reminder/Recall Technologies', the population group was from 0 to 17 years old.

In this cross sectional study, 25% of the parents stated that they preferred newer form of technology. Prior to this study, a conventional way of reminder such as mailing system and phone calls was practiced. This study also stated more than 50% of the parents were willing now to register their mobile phone numbers for future immunization schedule via mobile phone calls or text messages.

A systematic review of this text reminder system was also published by The Cochrane Collaboration. In 'Mobile Phone messaging reminder for attendance at healthcare appointments', a total of 8 randomised controlled trials were identified. The total number of patients was 6615 patients.

It was concluded here that mobile text messages improved the rate of non attendance compared to no intervention in 7 studies. Out of these studies, 2 papers studied the costs and financial benefits of this SMS reminder system and the result was in favour of SMS as a reminder.

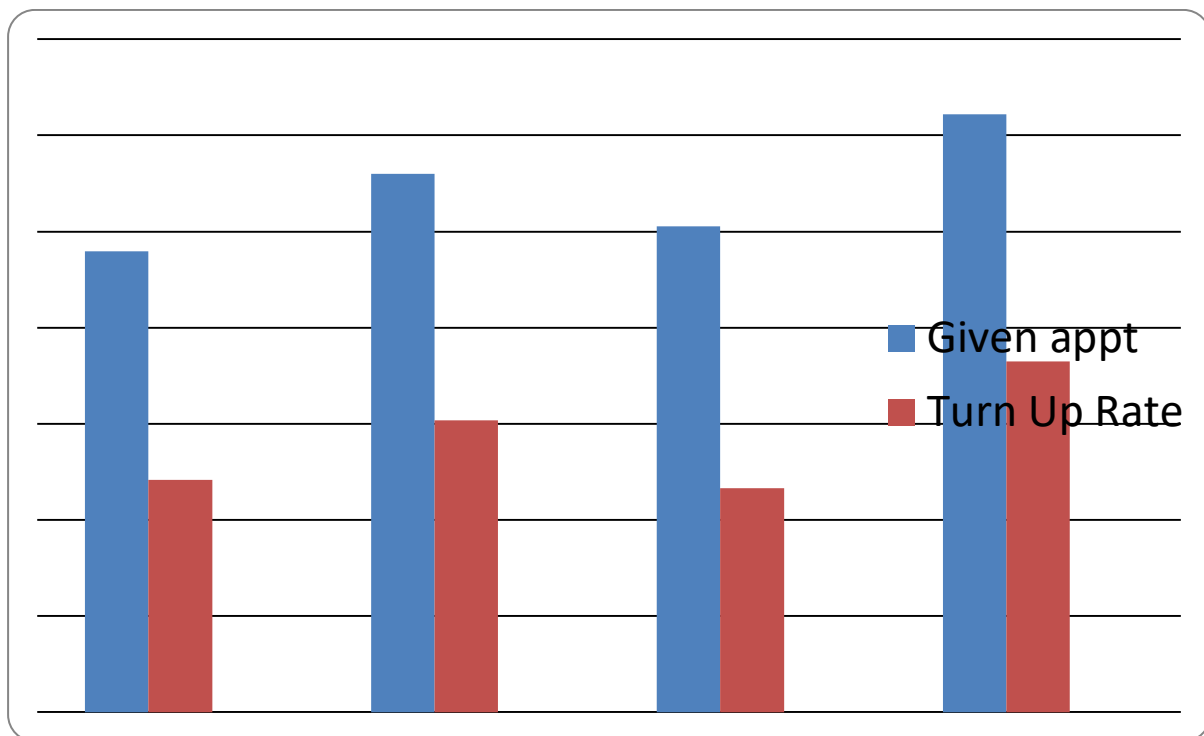
## JUSTIFICATION OF STUDY

In the study by Tamim et al 2011, the rate of non-attendance was 30%. The means of intervention was a single telephone call that improved the non-attendance rate by 15%. What is interesting was the most common reason cited was forgetfulness. It was as high as 48%.

**Table 2** Causes of non-attendance as mentioned by the parents

	Frequency	Percentage
Forgetfulness	48	50.5
Being busy	19	20
Bad weather	4	4.2
Parents claiming not to have received appointment date	3	3.2
Looking after sick relative	3	3.2
Sickness	10	10.5
School opening	4	4.2
Car broke down	1	1.1
Funeral	1	1.1
No transportation	2	2.1
Total	95	100

The data from 2016 monthly statistic records in HUSM suggest that the non-attendance rate is 41-50%. This figure is almost 20% higher compared to the non-attendance rate in 2011. Given that we have an average of 900-1200 patients scheduled to be seen every month, the above figures suggest that at least 400 patients are not getting the care that they deserve in each month.



If the same trend continues, this would pose a great burden to the hospital in the coming months and years. If these patients need to be rescheduled, this would definitely add the number of patients every day. This also means, a less quality time would be spent for each patient, in order for the doctors to complete their jobs before going home on time. Unless this problem is solved, we soon will create a vicious cycle within this context.

There are hidden uncalculated costs too that we bear because of this. Poorly optimised medical care will result in poorly controlled medical conditions, which ultimately result in further e.g. blood investigations in sorting out the complications. Hospital admission could possibly rise too. Having more patients too will result in more money to be spent on electricity and water bills, as well as the allowance perhaps from working after working hours. Many of these can be avoided, and the budget for the health care spending can be prudently managed.

A more efficient system must be introduced to tackle this issue. Nowadays with the widely used social media, the public are venting out their frustrations freely. Despite having a heavily subsidised health care system, we still ought to have a system that benefits every party in this society.

This intended new system must also be cost efficient. The previous study that used a single telephone call as an intervention was shown to be effective. However, if the previous study is to be implemented, a single phone call means having a dedicated staff making calls every day. Having a non-attendance rate averaging 400 patients per month, this idea is definitely not feasible.

We therefore feel that a study on this matter is timely. We attempt to test the 'SMS reminder system versus conventional system' in our clinic appointment system. As the statistics of non-attendance are worsening over the years, and after studying the complexity of local population, we reckon that we could benefit from a cheap and effective means of reminder. If the finding is positive, this could be used as a springboard towards a better and effective outpatient care in Hospital Universiti Sains Malaysia.

## **RESEARCH OBJECTIVES**

The general objective is to test the public acceptance of this new intervention. Despite having no local data to support its introduction, this needs no further delay. Malaysians are not much left behind in terms of SMS technology, in fact Malaysians are one of the highest Internet users for social media.

Specifically, we have divided the objectives into 2 main categories,

- a) To assess the proportion of non-attendance in Paediatric Clinics HUSM
- b) To compare the non-attendance rate in 'SMS reminder system versus Conventional System'

The research hypothesis that is set is SMS reminder system will improve the non-attendance rate in our Paediatric Clinics. Whereas, the null hypothesis from this study is that SMS Reminder System will not improve the non-attendance rate among Paediatric patients in the clinic settings.

## **METHODOLOGY/RESEARCH DESIGN**

This study is going to be a randomised control study. Since the location of study is going to be in Paediatric Clinics, the participants of this study are going to be the parents. The population study decided is patients that are seen at Paediatric Clinic HUSM.

**A current conventional system that is currently practised is an appointment card is given to the patient at the end of clinic consultation. The type of clinic, time and date will be written as a means or reminder for the patients.**

One research assistant will be hired to smoothen the flow. He or she is to be deployed at the registration counter. Eligibility criteria have been set, and those that meet them will be recruited into the study after obtaining their consent.

Upon getting their consent, they will go to the doctor's room for consultation. An envelope containing information whether they fall into the intervention or control group will be given beforehand. They will be randomly assigned and the content remains concealed until the end of clinic consultation.

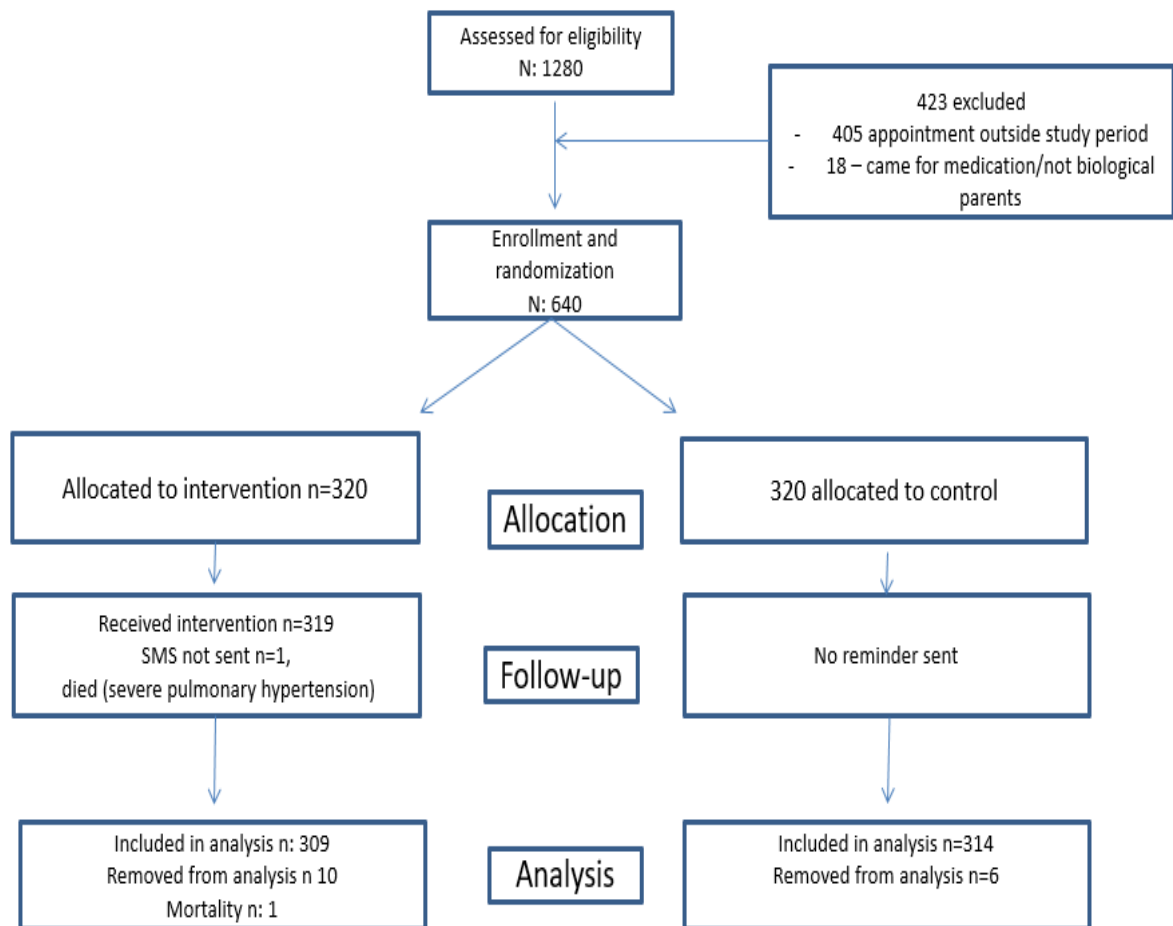
At the end of consultation, if the attending doctor decides the patient requires further follow up, the patient will be asked to go to the appointment room. Here they will be asked to open the envelope content, and if they fall into the intervention group, their particulars will be confirmed again including their mobile phone number.

A copy of patients' details and next appointment date will then be made and kept by the investigator. A period of 5-10 days before the next scheduled appointment is set before an SMS reminder is sent to the parents.

To those that fall under the control study, the current practice of manually written date and time on the appointment card will be continued. They will receive no reminder before their next appointment.

The data that is required is the attendance recorded when they turn up for the appointment. Data analysis will commence upon completion of this study.

# STUDY FLOW CHART



## SAMPLE SIZE

The sample size calculated for the secondary objective is calculated using the PS Software (DUport WD et al 1990). By using the study from ‘Non attendance to the paediatric clinics in a Malaysian tertiary hospital, a sizeable problem and identification of an efficacious intervention’, there is about 1500 patients children came for follow up with about 30% non attendance.

Prior data indicate that the non-attendance rate among controls is 0.3. If the true non-attendance rate for experimental subjects is 0.10, we will need to study 320 experimental subjects and 320 control subjects

The Type I error probability associated with this test of this null hypothesis is 0.05. We will use an uncorrected chi-squared statistic to evaluate this null hypothesis.

- expected P=0.3 from Tamim et. Al (Non-attendance to the Paediatric in a Malaysian tertiary hospital )

$$\begin{aligned} N &= 1.96^2 \cdot 0.3(1-0.3)/0.052 \\ &= 3.8416 \times 0.3 (0.7) /0.052 \\ &= 3.846 \times 0.3 \times 0.7/0.0025 \\ &= 320 \text{ subjects needed} \end{aligned}$$

### **INCLUSION CRITERIA**

- a) Require further appointment
- b) Good understanding of Malay/English
- c) Good means of commuting to HUSM – **patients/parents have their own transport or any assistance that enables them to come to the clinic on given date**

### **EXCLUSION CRITERIA**

- a) High risk patients for recurrent admissions – e.g. patients with an established diagnosis of severe epilepsy or poorly controlled asthma will not be considered. Other diagnosis that would be opted out will depend on the attending doctor's jurisdiction
- b) Frequent defaulters – anyone that has a poor track record of clinic appointments will be excluded.
- c) Non- consented parents
- d) Next appointment is longer than 3 months –Time is the biggest hurdle in this study. Ideally in the future the study can be further extended to a longer period, and other disciplines included too for a more accurate picture.

### **RECRUITMENT OF SUBJECTS**

As this is a study that involves minimal potential health effects, the large number of patients are potentially recruit able. Upon getting their consent, data collection can be initiated. Parents will not be forced into participating, and they will be free to withdraw their participation at any point of this study.

For this purpose, we plan to hire a research assistant to help with the recruitment. All potential patients will be approached for recruitment purpose.

#### **RANDOMISATION, MATCHING AND BLINDING**

After consent is obtained, patients will be randomly allocated into intervention or control group. The content is also concealed to the researcher and patients, and they will only find out at the end of clinic consultation.

The randomisation will be manually performed by the research assistant 2 weeks before enrolment starts. They will be placed into 1 ballot in each enveloped.

#### **SUITABILITY OF STUDY AREA**

The identified study location is Paediatric Clinic in Hospital Universiti Sains Malaysia. We reckon that the identified population possess the requirement that is mobile phone with text reminder capability. This involves no financial costs implicated to the patients as they will only receive an SMS reminder without having to reply to us back.

#### **Withdrawal Criteria**

Patients will be free to withdraw their participation from this study. Patients will not be forced to participate nor they will be stopped from pulling out should they wish to do so.



## PRO FORMA

### JABATAN PAEDIATRIK, HOSPITAL UNIVERSITI SAINS MALAYSIA



Anda dipanggil untuk mengikuti penyelidikan secara sukarela yang melibatkan 2 sistem temujanji klinik yang berbeza. 2 sistem yang dimaksudkan adalah kaedah temujanji yang sedia ada ataupun pendaftaran secara online diikuti dengan peringatan melalui SMS.

Sekiranya anda bersetuju, kami ingin meminta anda mengisi maklumat di bawah dengan tepat.

#### BUTIR-BUTIR PERIBADI

NAMA PESAKIT:

NAMA IBU/BAPA:

NO PENDAFTARAN:

ALAMAT:

JENIS KLINIK:

TAHAP PENDIDIKAN: SPM/ DIPLOMA/ UAZAH/  
MASTER  
TERTINGGI IBU BAPA

JUMLAH PENDAPATAN: < RM 1000  
KELUARGA < RM 5000  
> RM 5000

#### OBJECTIVE

1. Menilai kadar kehadiran pesakit di Klinik Paediatric HUSM
2. Perbandingan kadar kehadiran pesakit melalui 2 sistem yang berbeza, konvensional ataupun 'pendaftaran online beserta peringatan SMS'



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SEBARANG MAKLUMAT YANG DIBERIKAN ADALAH TERTAKLUK KEPADA PERATURAN UNIVERSITI DAN UNDANG-UNDANG. PENDEDAHAN KEPADA MASYARAKAT TANPA KEIZINAN ADALAH TIDAK DIBENARKAN

## **ETHICAL CONSIDERATION**

It is paramount that we strictly adhere to the rules of data confidentiality. This will have been explained to the parents prior to their enrolment.

As mentioned before, this trial imposes minimal or no health hazards. What we are trying to evaluate is the missed appointment rate in the Paediatric Clinics in HUSM via SMS Reminder System or the conventional one.

## **PROPOSED DATA ANALYSIS AND EXPECTED RESULT**

For the first objective, it will be a cross sectional study. Therefore, Chi Square statistical analysis will be used.

Non-attendance in this study is defined as not turning up on the scheduled appointment date.

For the evaluation of the variables, multiple logistic regression will be used for statistical analysis.

Expected result

	<b>Control</b> <b>N = 320</b>	<b>Intervention</b> <b>N = 320</b>	<b>P value</b>
Education			
- PRIMARY			
- SECONDARY			
- TERTIARY			
INCOME			
- <RM1000			
- <RM4999			
- >RM5K			

TYPE OF CLINICS			
<ul style="list-style-type: none"> <li>- Neurology</li> <li>- Neonatology</li> <li>- Haematology</li> <li>- General</li> <li>- Gastroenterology</li> <li>- Nephrology</li> <li>- Cardiology</li> <li>- Endocrine</li> </ul>			

### **BENEFITS TO SUBJECT**

Patients that are enrolled and belong to the intervention group will experience a new system that is intended to exploit the current trend of technology.

This new system will be completely free of charge to them. They will also be provided with the researcher's contact number should they encounter any problems throughout this study.

### **HANDLING PRIVACY & CONFIDENTIALITY ISSUE**

Only patient's Registration Number (RN) will be used for identification. All that have been mentioned in the consent form regarding confidentiality will be strictly adhered.

All documents will be kept by Primary Investigator and any documents shall not be released to anyone without any consent from the parents and the authority.

### **INCENTIVE/COMPENSATION/REIMBURSEMENT**

No monetary incentives/compensation/reimbursement will be provided as part of this study.

### **DECLARATION OF CONFLICT OF INTEREST**

I hereby declare that I have no conflict of interest pertaining to the conduct of this study.

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	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Project activities								
Literature review								
Draft proposal and study other documents								
Data collection and QC								
Data entry								
Data cleaning								
Data analysis								
Report writing								
Report submission								

# **NON-ATTENDANCE IN PAEDIATRIC OUTPATIENT CLINICS, TEXT REMINDER VERSUS CONVENTIONAL SYSTEM A RANDOMISED CONTROL TRIAL**

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**INTRODUCTION:** A high non-attendance rate (NAR) in outpatient clinics continues to pose a significant problem not only in Malaysia but worldwide. A high NAR has negative consequences to costs of health care and quality of patient care. Hence, this study was undertaken to evaluate if SMS reminder could improve the NAR compared to the conventional system in a paediatric clinic at a tertiary hospital in East Coast Malaysia.

**Methods:** We conducted a parallel single blind randomised controlled trial where consented parents of patients that required a clinic appointment were recruited into the study. Upon randomisation, subjects were allocated either to the intervention group that will receive SMS reminder or the control group. In the intervention group, an SMS reminder will be sent a week before the appointment date but the control group will not be given any reminder.

**Results:** 314 subjects were analysed in control group and 309 subjects for the intervention rate. The NAR in our clinics was 33% and the SMS reminder significantly reduced the NAR in the intervention compared by 15.1% ( $p<0.001$ ) to the conventional

system. There was no significant association in the analysis of socioeconomic status with attendance rate.

**Conclusion:** SMS reminder was effective in reducing the NAR at Paediatric outpatient clinics compared to the conventional system. Poor socioeconomic status did not have any negative effect in attendance rate.

**Key words:** non-attendance, missed appointments, SMS reminder, outpatient (218 words)

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# **NON-ATTENDANCE IN PAEDIATRIC OUTPATIENT CLINICS, TEXT REMINDER VERSUS CONVENTIONAL SYSTEM A RANDOMISED CONTROL TRIAL**

## **INTRODUCTION**

There is an increasing number of both outpatients and inpatients attending the government hospitals in many parts of the world over the past few years <sup>(1)</sup>. Similarly, this trend is also observed in all our outpatient clinics from 2015-2016<sup>(2)</sup>. However, the rate of non-attendance seems fluctuating over the past 12 months, ranging from 31.1% to as high as 48.8%.

Several studies have been undertaken in the South East Asian region to look at ways to reduce the non-attendance rate (NAR) in the outpatient clinics. In the study performed in our center in 2011<sup>(3)</sup>, the non-attendance rate was 30%, consistent with many parts of the world <sup>(3, 4)</sup>. This trial attempted telephone call reminder three days before their appointment. The attendance rate was 76.8% for patients who could be contacted by phone. However, only 32% of the participants were contactable by phone, making phone reminder an ineffective method in this population. In another study <sup>(5)</sup> conducted in a teaching hospital located at the capital of Malaysia, both SMS and phone reminders were shown to be effective in improving the NAR.

A good attendance is paramount for continuity of care, especially for chronic diseases. Any disruption to a good care may result in deterioration to a person's health <sup>(6,7)</sup>. Therefore, a special attention must be rendered to improve the outpatient attendance. A non-attendance of 20-30% is quoted as average, but this should not be deemed as effective way forward. A poor attendance creates a vicious cycle, and this impacts negatively on the physical wellbeing, as well as financially of all parties involved.



A high NAR also has negative implications to health care expenditure. Underutilised health care will result in heaps of wastages from financial and human resource point of view. Further improvements must be considered in order to correct this undesired phenomenon. Therefore, all the parties must sit down together to fix this issue as a whole.

There are several groups that have been identified at risk for poor attendance <sup>(11)</sup>. However, it is important to note the commonest reason for non-attendance was forgetfulness <sup>(3)</sup>, that accounted for almost 50.5%. This is preventable, and potentially can result in better utilisation of the health care.

Hence there must be a continuous effort to bring down the NAR. There have been numerous ways experimented to reduce NAR, however the successful implementation of the previously tested method may not work well in all settings. In this trial, the main objective was to assess the efficacy of SMS reminder in reducing the rate of non-attendance in Paediatric Clinic Hospital USM. This SMS reminder efficacy will be compared with the existing conventional system in which there will be no additional reminder given prior to their scheduled appointment. The relationship of socioeconomic factors with non-attendance was also included as a secondary analysis.

## **METHODS**

This was a single blind randomized controlled trial with the allocation ratio of 1:1. This study was conducted in the paediatric clinics in Hospital USM. Hospital USM is a tertiary centre for the East Coast of Peninsular Malaysia. The subspecialties provided here are Neurology, Cardiology, Neonatology, Gastroenterology, Endocrine, General, Haemato-Oncology and Nephrology. These services are supervised by senior consultants in their respective field. We have an average of 1000-1400 patients every month registered for clinic appointments.

The duration of this study was two months, from April to May 2017. This trial was approved by the Research Ethics Committee of the Medical School of Universiti Sains Malaysia. The subjects were the parents of paediatric patients in our clinic.

For the primary objective, the required sample size was 320 subjects for each arm, calculated using PS Software. Based on the previous study, if true improvement of non-attendance rate after intervention was 10%, a sample of 320 subjects would be required for each arm ( $\alpha = 0.05$ ,  $B = 20\%$ , power 80%).

All pre-existing patients and new referrals were eligible to participate in this study. The inclusion criteria were if a new or further appointment was required within the study period and a good basic understanding of Malay and English. Frequent defaulters, and high-risk patients such as poorly controlled epilepsy were excluded. Participants were recruited after a block of 2 randomisation process, followed by consent taking. A block of two randomisation was generated using website software. The primary investigator was blinded of the allocation process. An SMS reminder was sent a week before the appointment for the intervention group. If the appointment was changed for any reason, a new text reminder

would be sent. For the control group, they would continue with the conventional system. Conventional system here is defined as the current practice of appointment system in Hospital USM, where an electronically printed card with his or her registration number is given to the patient, with appointment date and time manually written. A phone call will be made if a change of date is made. However, there will not be any reminder sent before their appointments. Information pertaining to variables such as levels of education, main caretaker and salary will be recorded in the data collection form.

The level of education was divided into three, primary, secondary and tertiary. Primary is equivalent to having no academic qualification, whereas secondary is high school certificate and any qualifications greater than diploma were classified into tertiary. The stratification of level of income was adjusted closely to the figures provided by the Malaysian government <sup>(9)</sup>. Local currency Ringgit Malaysia (RM) was used instead (the current exchange rate is 1USD = RM4-4.40). The parents were asked to elect one guardian or both in the main caretaker segment, for evaluation if this had any relationship with the attendance.

All collected data were analysed in IBM SPSS Statistics 24. Pearson Chi-Square was used to evaluate the distribution demographically. The non-attendance rate was presented in percentage form. The categorical variables were analysed with multiple logistic regression test. The result was considered significant if the p-value was <0.05.